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10/089,433	03/29/2002	Joseph P. Marino, Jr.	P51034	6921

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SMITHKLINE BEECHAM CORPORATION
CORPORATE INTELLECTUAL PROPERTY-US, UW2220
P. O. BOX 1539
KING OF PRUSSIA, PA 19406-0939

EXAMINER

ANDERSON, REBECCA L

ART UNIT	PAPER NUMBER
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1626

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/089,433

Applicant(s)

MARINO, JR. ET AL.

Examiner

Rebecca L Anderson

Art Unit

1626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-38 and 42 is/are rejected.
- 7) ☒ Claim(s) 22-29, 31-34 and 36-42 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 17 May 2004.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claims 22-42 are currently pending in the instant application. Claims 22-38 and 42 are rejected and claims 22-29, 31-34 and 36-42 are objected.

Response to Arguments and Amendments

Applicants amendment to the claims, filed May 17, 2004, has cancelled all previously pending claims and added new claims 22-42.

Applicants new claims, directed to triazole substituted furan-C0-6alkyl wherein X is S, R1 is optionally substituted furan-C0-6alkyl, R1 is optionally substituted Ar-C0-6alkyl, and R3 is H, optionally substituted C1-6alkyl, C3-6alkenyl or C3-6 alkynyl have not overcome the objection to the claims as containing non-elected subject matter since the claims contain compounds besides wherein R1 is optionally substituted furan as stated in the lack of unity requirement, elected group II, 23 May 2003, specifically, the claims 22-24, 26-29, 31-34, 36-39, 41 and 42 still contain optionally substituted furan-C1-6alkyl, which is non-elected subject matter. Applicant stated on page 13 of the remarks filed 17 May 2004 that the restriction to "optionally substituted furan" has been interpreted to mean "optionally substituted furan-C0-6alkyl". However, as stated above, the elected Group II from the lack of unity requirement stated that R1 is only optionally substituted furan.

Applicants arguments filed, May 17 2004, have been considered but are not found persuasive as discussed below.

In regards to the written description rejection and enablement rejection of claims 1-15, which correspond to new claims 22-36, Applicant argues that the requirement for enablement is described in MPEP 2164.01(b) which states:

"As long as the specification discloses at least one method of making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, then the enablement requirement of 35 USC 112 is satisfied."

and that the instant specification fulfills these requirements by providing methods of making the compounds of the invention and providing a use of the claimed invention.

However, this argument is not found persuasive since the claims at issue are method claims and while the instant specification has provided how to prepare the compounds used in the method claims and has stated the method of use in the specification, the claims are rejected under written description and enablement since the specification has not provided any one of the compounds of the instant invention inhibiting MetAP2 in a mammal or treating or preventing any one disease found in the claims. Therefore, applicant has not provided a method of inhibiting MetAP2 or treating or preventing diseases with the compounds of the formula (IA) that bears a reasonable correlation to the entire scope of the claims, which is inhibition and treatment or prevention of various diseases with all compounds of the formula (IA). Applicant has only provided an invitation to experiment with the assays provided in the specification in order to determine, with no certainty, which compounds, if any, are inhibitors of MetAP2.

The applicant further argues that enablement is not precluded by the necessity for some experimentation such as routine screening. However, this argument is not found persuasive since the instant specification states that the structure/activity relationship has not yet been established for the compounds of the invention and the

Art Unit: 1626

specification has further not provided any experimentation that the instant compounds of the formula (IA) can inhibit MetAP2 in mammals. Therefore, it has not been reasonably conveyed to one skilled in the relevant art that the inventors at the time the application was filed had possession of the inhibition of MetAP2 in mammals and the treatment and prevention of various claimed diseases with the compounds of the formula (IA) and since one of skill in the art would need to determine what listed and unlisted diseases would be benefited by the inhibition of MetAP2 and would furthermore have to determine which, if any, of the compounds of the present invention would inhibit MetAP2 and applicant has only invited one of ordinary skill in the art to determine which compounds, if any, of this invention are inhibitors of MetAP2, it is considered that the quantity of experimentation needed is not routine screening and is undue experimentation.

Applicant states that there is no requirement that the "full" structure/activity relationship be established for all compounds falling within a generic structure to satisfy the enablement requirement and that the specification does not have to be a blueprint in order to satisfy the requirement for enablement, however, it is noted that the specification must provide a clear written description of the invention claimed and must provide enablement of the invention claimed and the instant specification only proves an invitation to experiment to determine which, if any, of the compounds of the formula (IA) can inhibit MetAP2 and treat or prevent the claimed diseases.

Applicants submit that the background art cited in the specification and the two additional recent references provide support for applicants claims and to the therapeutic

value of inhibition of MetAP2. As stated on page 4 of the previous office action, the examiner does not disagree that the references provided support the therapeutic value of inhibition of MetAP2, the examiner disagrees that the references provide support for applicants claims since the instant specification states that the structure/activity relationship has not been established for the compound of the invention and none of the references disclose, fails to provide written description and enablement of the claimed invention since it only invites experimentation to determine which, if any, of the compounds of the formula (IA) can inhibit MetAP2.

Therefore, the written description and enablement rejections of claims 1-15 is still maintained by the rejection of new claims 22-36.

Claim Objections

Claims 22-24, 26-29, 31-34, 36-39, 41 and 42 are objected to for containing non-elected subject matter, specifically subject matter drawn towards other than products of formula (I) wherein X is S, R1 is optionally substituted furan, their methods of preparation and their methods of use. Claims 22-24, 26-29, 31-34, 36-39, 41 and 42 drawn solely to the elected invention and free of the following 35 USC 112 1st paragraph rejections would appear allowable over the prior art of record.

Claim 40 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

Art Unit: 1626

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 22-36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants instant claims 22-36 claim a method of inhibiting MetAP2 in mammals with the compound of the formula (IA) (claims 22-26), a method for treating (including prophylactic, page 26 of specification) a disease mediated by MetAP2 in mammals by administering the compound of formula (IA) (claims 27-31) and a method of treating (including prophylactic, page 26 of specification) conditions mediated by angiogenesis selected from cancer, haemangioma, proliferative retinopathy, rheumatoid arthritis, atherosclerotic neovascularization, psoriasis, ocular neovascularization and obesity by administering the compound of the formula (IA) (claims 32-36).

Applicants instant specification provides references which correlate the treatment of solid tumors with an angiogenesis inhibitor that targets type 2 methionine aminopeptidase (pages 1-4). Applicant states that the inhibition of angiogenesis has been shown to effectively stop the proliferation and metastasis of solid tumors (page 1). Applicant also states that a recently published study has shown that the myristoylation of nitric oxide synthase, a membrane protein involved in cell apoptosis, was blocked by fumagillin. Furthermore, applicant states that there appears to be a clear correlation

Art Unit: 1626

between the inhibition effect of fumagillin related compounds against the enzymatic activity of hMetAP2 in vitro and the suppression effect of these compounds against tumor-induced angiogenesis in vivo (page 3). Applicant provides many examples of the compounds of the invention on pages 27-97 and provides direction as to how to measure the hMetAP2 activity by direct spectrophotometric assays of hMetAP2 (page 97), by coupled spectrophotometric assays of hMetAP2 (page 98), Kinetic Data analysis (page 99) and how to test the ability of MetAP2 inhibitors to inhibit cell growth by standart XTT microtitre assay (page 99).

However, applicants instant specification also states on page 100 that

The full structure/activity relationship has not yet been established for the compounds of this invention. However, given the disclosure herein, one of ordinary skill in the art can utilize the present assays in order to determine which compounds of the invention are inhibitors of MetAP2 and which bind thereto with an IC50 value in the range of 0.0001 to 100uM.

This statement from page 100 of the instant specification indicates that applicant is not is possession of the methods of inhibiting MetAP2 in mammals, treating diseases mediated by MetAP2 or treating conditions mediated by angiogenesis selected from cancer, haemangioma, proliferative retinopathy, rheumatoid arthritis, atherosclerotic neovascularization, psoriasis, ocular neovascularization and obesity with the compounds of the invention. While applicant has stated in the specification a specific utility for the compounds of the invention for inhibiting MetAP2, treating diseases mediated by MetAP2 and treating conditions mediated by angiogenesis this utility is not sufficiently enabled since applicant has stated that the structure/activity relationship has not yet been established for the compounds of this invention and applicant has only invited one of ordinary skill in the art to experiment and determine which, if any,

Art Unit: 1626

compounds of the invention are inhibitors of MetAP2. Applicant has not provided data as to which, if any of the compounds of the invention can inhibit MetAP2, treat diseases mediated by MetAP2 or treat conditions mediated by angiogenesis. Applicant is silent to the correlation of the diseases listed as mediated by angiogenesis with angiogenesis or the inhibition of MetAP2. Applicant has only provided examples of the compounds of the invention and assays to test the compounds of the invention. Applicant has only provided an invitation to experiment with the assays provided in the specification in order to determine, with no certainty, which compounds, if any, are inhibitors of MetAP2.

Therefore, since the specification fails to describe the inhibition of MetAP2, treatment of diseases mediated by MetAP2 and the treatment of conditions mediated by angiogenesis in such a way as to reasonably convey to one skilled in the relevant art that the inventors at the time the application was filed has possession of the claimed invention of claims 22-36 by failing to correlate the disease conditions to MetAP2 and by stating that the full structure/activity relationship has not yet been established for the compounds of this invention, claims 22-36 are rejected under 35 USC 112, first paragraph as failing to comply with the written description requirement.

Claims 22-36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

As stated in the MPEP 2164.01 (a), "There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue."

In In re Wands, 8 USPQ2d 1400 (1988), factors to be considered in determining whether a disclosure meets the enablement requirement of 35 U.S.C. 112, first paragraph, have need described. They are:

1. the nature of the invention,
2. the state of the prior art,
3. the predictability or lack thereof in the art,
4. the amount of direction or guidance present,
5. the presence or absence of working examples,
6. the breadth of the claims,
7. the quantity of experimentation needed, and
8. the level of the skill in the art.

In the instant case,

Applicants instant claims 22-36 claim a method of inhibiting MetAP2 in mammals with the compound of the formula (IA) (claims 22-26), a method for treating a disease mediated by MetAP2 in mammals by administering the compound of formula (IA) (claims 27-31) and a method of treating conditions mediated by angiogenesis selected from cancer, haemangioma, proliferative retinopathy, rheumatoid arthritis, atherosclerotic neovascularization, psoriasis, ocular neovascularization and obesity by administering the compound of the formula (IA) (claims 32-36).

The nature of the invention

The nature of the invention is the inhibition of MetAP2 in mammals to treat and prevent diseases mediated by MetAP2 which are diseases mediated by angiogenesis such as cancer.

The state of the prior art

The state of the prior art is that for tumors to grow beyond a critical size and to spread to form metastases, they must recruit endothelial cells from the surrounding stroma to form their own endogenous microcirculation in a process termed angiogenesis and the inhibition of this process has been shown to effectively stop the proliferation and metastasis of solid tumors and that possible roles of MetAP2 in cell proliferation has been suggested.

However, Son et al. Discloses that in regards to 5-Demethylovalicin as a methionine aminopeptidase-2-inhibitor in a model of angiogenesis inhibition, the 5-Demethylovalicin has no cytotoxicity to cancer cell lines.

Also, In regards to page 2 of the instant specification, which discusses that the myristoylation of nitric oxide synthase, a membrane protein involved in cell apoptosis, was blocked by fumagillin, it is known in the prior art (Lala et al. page 91) that the role of NO in tumor biology remains incompletely understood with both the promotion and inhibition of MO mentioned for the treatment of tumor progression and only certain human cancers may be treated by selected NO-blocking drugs.

Applicants have also stated on page 100 of the instant specification that the full structure/activity relationship has not yet been established for the compounds of the invention.

The predictability or lack thereof in the art

The instant claimed inventions are highly unpredictable as discussed below:

It is noted that the pharmaceutical art is unpredictable, requiring each embodiment to be individually assessed for physiological activity. In re Fisher, 427 F.2d 833, 166 USPQ 18 (CCPA 1970) indicates that the more unpredictable an area is, the more specific enablement is necessary in order to satisfy the statute. In the instant case, the instant claimed inventions are highly unpredictable since one skilled in the art would recognize that in regards to therapeutic effects of the inhibition of MetAP2, whether or not a compound inhibits MetAP2 and whether or not the disease is mediated by angiogenesis or MetAP2 would affect the possible treatment or prevention of any disease.

Hence, in the absence of a showing of the correlation between all the diseases listed as mediated by angiogenesis and a showing of what diseases are mediated by MetAP2 to the inhibition of MetAP2, and a showing of which, if any, of the instant compounds of the invention inhibit MetAP2, one of skill in the art is unable to fully predict possible results from the administration of the compound as instantly claimed due to the unpredictability of the role MetAp2 in disease treatment and prevention and the unpredictability of the structure/activity relationship for the compounds of the invention and the inhibition of MetAp2.

The nature of the pharmaceutical arts is that it involves screening in vitro and in vivo to determine which compounds exhibit the desired pharmacological activities.

There is no absolute predictability even in view of the seemingly high level of skill in the art. The existence of these obstacles establishes that the contemporary knowledge in the art would prevent one of ordinary skill in the art from accepting any inhibition, therapeutic or preventive regimen on its face.

The amount of direction or guidance present and the presence or absence of working examples

Applicants instant specification provides references which correlate the treatment of solid tumors with an angiogenesis inhibitor that targets type 2 methionine aminopeptidase (pages 1-4). Applicant states that the inhibition of angiogenesis has been shown to effectively stop the proliferation and metastasis of solid tumors (page 1). Applicant also states that a recently published study has shown that the myristoylation of nitric oxide synthase, a membrane protein involved in cell apoptosis, was blocked by fumagillin. Furthermore, applicant states that there appears to be a clear correlation between the inhibition effect of fumagillin related compounds against the enzymatic activity of hMetAP2 in vitro and the suppression effect of these compounds against tumor-induced angiogenesis in vivo (page 3). Applicant provides many examples of the compounds of the invention on pages 27-97 and provides direction as to how to measure the hMetAP2 activity by direct spectrophotometric assays of hMetAP2 (page 97), by coupled spectrophotometric assays of hMetAP2 (page 98), Kinetic Data analysis

(page 99) and how to test the ability of MetAP2 inhibitors to inhibit cell growth by standard XTT microtitre assay (page 99).

However, applicants instant specification also states on page 100 that

The full structure/activity relationship has not yet been established for the compounds of this invention. However, given the disclosure herein, one of ordinary skill in the art can utilize the present assays in order to determine which compounds of the invention are inhibitors of MetAP2 and which bind thereto with an IC50 value in the range of 0.0001 to 100uM.

This statement from page 100 of the instant specification indicates that applicant is not in possession of the methods of inhibiting MetAP2 in mammals, treating diseases mediated by MetAP2 or treating conditions mediated by angiogenesis selected from cancer, haemangioma, proliferative retinopathy, rheumatoid arthritis, atherosclerotic neovascularization, psoriasis, ocular neovascularization and obesity with the compounds of the invention. While applicant has stated in the specification a specific utility for the compounds of the invention for inhibiting MetAP2, treating diseases mediated by MetAP2 and treating conditions mediated by angiogenesis this utility is not sufficiently enabled since applicant has stated that the structure/activity relationship has not yet been established for the compounds of this invention and applicant has only invited one of ordinary skill in the art to experiment and determine which, if any, compounds of the invention are inhibitors of MetAP2. Applicant has not provided data as to which, if any of the compounds of the invention can inhibit MetAP2, treat diseases mediated by MetAP2 or treat conditions mediated by angiogenesis. Applicant is silent to the correlation of the diseases listed as mediated by angiogenesis with angiogenesis or the inhibition of MetAP2. Applicant has only provided examples of the compounds of the invention and assays to test the compounds of the invention. Applicant has only

provided an invitation to experiment with the assays provided in the specification in order to determine, with no certainty, which compounds, if any, are inhibitors of MetAP2.

The breadth of the claims

The breadth of the claims is the inhibition of MetAP2, the treatment and prevention of any disease mediated by MetAP2 and the treatment and prevention of any condition mediated by angiogenesis with the compound of the formula (IA).

The quantity of experimentation needed

The quantity of experimentation needed is undue experimentation. One of skill in the art would need to determine what listed and unlisted diseases would be benefited by the inhibition of MetAP2 and would furthermore have to determine which, if any, of the compounds of the present invention would inhibit MetAP2 since applicant has not provided data as to the structure/activity relationship between the compounds and the inhibition of MetAP2 and has only invited one of ordinary skill in the art to assay to determine which compounds, if any, of this invention are inhibitors of MetAP2.

The level of the skill in the art

The level of skill in the art is high. However, due to the unpredictability in the pharmaceutical art, it is noted that each embodiment of the invention is required to be individually assessed for physiological activity by in vitro and in vivo screening to determine which compounds exhibit the desired pharmacological activity and which diseases would benefit from this activity.

Thus, the specification fails to provide sufficient support of the broad use of the compounds of the formula (IA) for the inhibition of MetAP2, the treatment and

Art Unit: 1626

prevention of diseases mediated by MetAP2 and the treatment and prevention of conditions mediated by angiogenesis. As a result necessitating one of skill to perform an exhaustive search for which MetAP2-mediated diseases and which angiogenesis mediated conditions can be treated or prevented by the compound of formula (IA) and which compounds of the present invention can inhibit MetAP2 in order to practice the claimed invention.

Genentech Inc. v. Novo Nordisk A/S (CA FC) 42 USPQ2d 1001, states that "a patent is not a hunting license. It is not a reward for search, but compensation for its successful conclusion" and "[p]atent protection is granted in return for an enabling disclosure of an invention, not for vague intimations of general ideas that may or may not be workable".

Therefore, in view of the Wands factors and In re Fisher (CCPA 1970) discussed above, to practice the claimed invention herein, a person of skill in the art would have to engage in undue experimentation, with no assurance of success.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 37, 38 and 42 are rejected under 35 USC 112 2nd paragraph. Claim 37 and 42 recite the limitation ""provided that the

compound is not 5-anilino-3-benzylthio-1,2,4-triazole, 3-(4-methyl-anilino)-5-benzylthio-1,2,4-triazole, 3-(2-methyl-anilino)-5-benzylthio-1,2,4-triazole, 3-(4-methoxy-anilino)-5-benzylthio-1,2,4-triazole, 3-(2-methoxy-anilino)-5-benzylthio-1,2,4-triazole, or 3-ethyl-3-anilino-5-benzylthio-1,2,4-triazole.

in the compounds of the formula (IA). There is insufficient antecedent basis for this limitation in the claims. Specifically, the claims provide out compounds from the

compounds of the formula (IA) that are not encompassed by the description of the compounds of the formula (IA) in the new claims which have been amended to delete non-elected subject matter. This rejection can be overcome by deleting the proviso from the claims 37 and 42.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Rebecca L. Anderson whose telephone number is (703) 605-1157. Mrs. Anderson can normally be reached Monday through Friday 7:00AM to 3:30PM.

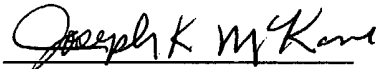
If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Joseph McKane, can be reached at (703) 308-4537.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rebecca Anderson
Patent Examiner
Art Unit 1626, Group 1620
Technology Center 1600



Joseph McKane
Supervisory Patent Examiner
Art Unit 1626, Group 1620
Technology Center 1600